OCTOBER, 1962

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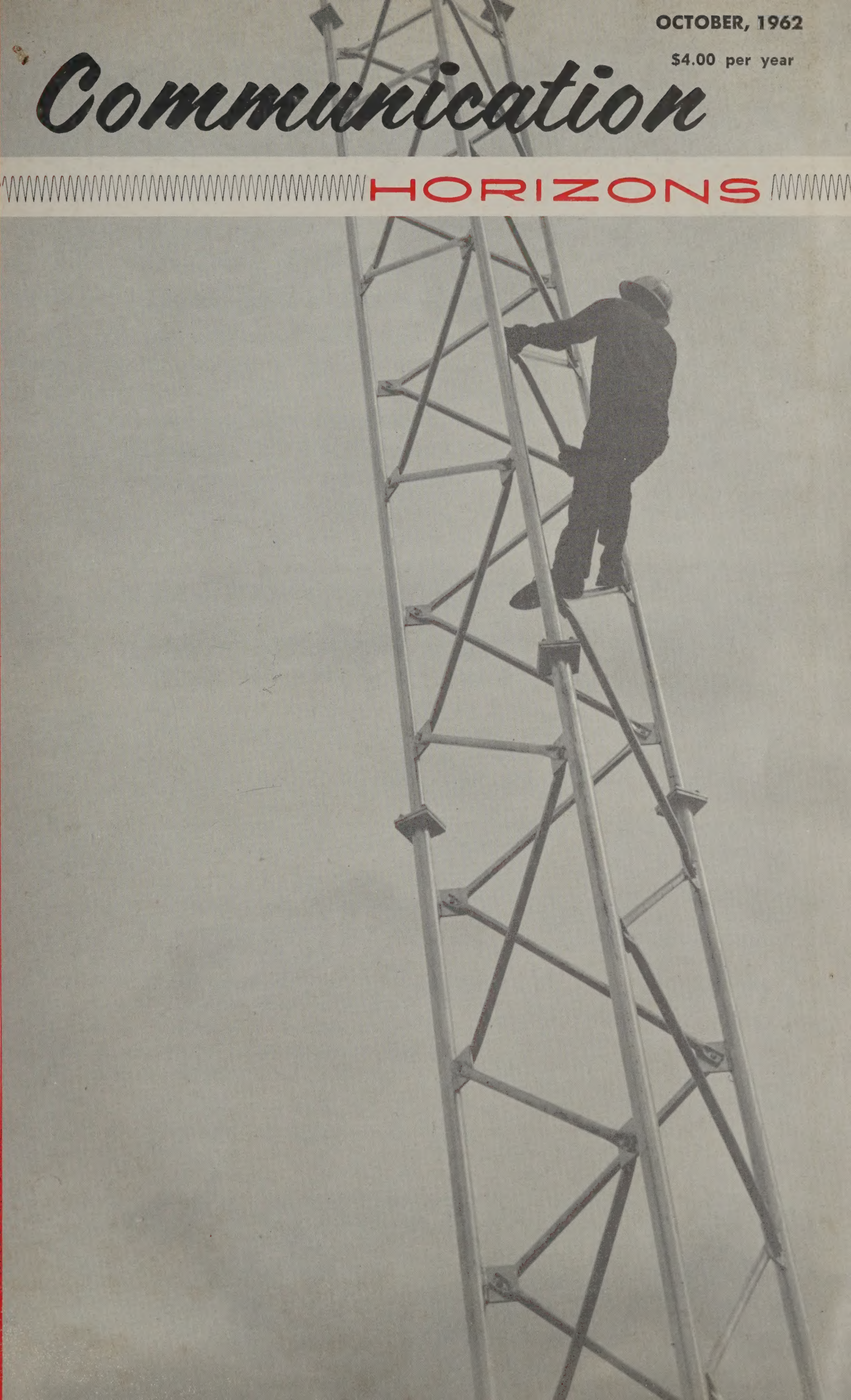

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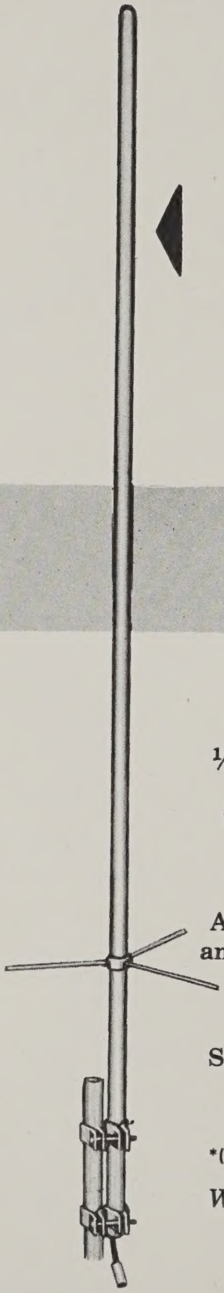

MODEL ASP-298

This Colinear Vertical 6 db gain* antenna provides omnidirectional coverage in the 130 - 174 mc range. Gives 4 times the radiated power of your transmitter and is twice as sensitive in receiving. Heavy duty construction throughout with adequate lightning protection. Write for complete listings in Catalog SD-152. (Base Station Antennas)

*(Reference: Ground Plane Antenna)

MOBILE ROOF TOP ANTENNAS

MODEL ASPR177

½ wave length, high gain, roof top antenna. 130 - 174 MC. 3db gain* doubles transmitting power. Sealed, tamper-proof transformer. 100 watt continuous load.

MODEL ASPR203 Kit to adapt ASPR177 to fit GE and RCA mounting base and convert these models to ½ wave length. 100 watt continuous load.

MODEL ASPR206 Conversion Kit. Same as ASPR203 except converts Motorola TU316 or P-9363 antenna to ½ wave length high gain, 100 watts.

*(Reference: ¼ Wave Length Antenna)

Write for Complete Listings of Communication Antennas in Catalog SD-144.

CERTIFIED
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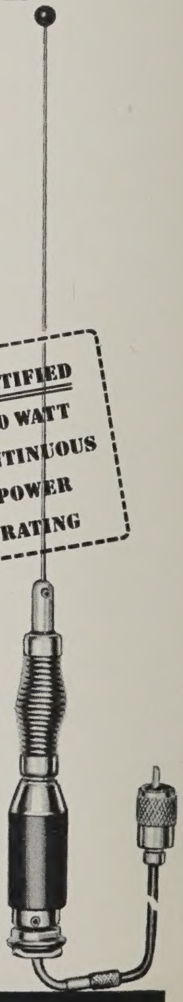
CONTINUOUS
POWER
RATING



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SPLATTER

from **JIM KYLE, K5JKX**
CH Managing Editor

You may recall how for the past several months I've been after you to let me know what you think of the magazine. Several of your letters have raised some interesting questions, and I intend to share them with all of you. Who knows — maybe we'll even get some interesting answers.

For a lead-off, let's take Mr. Morris L. Brown, of Brown's Marine Electronics, North Ridgeville, Ohio.

Mr. Brown, like most of us, has one major problem. It's the same one Kay Redd has mentioned several times in his column — the customer who feels that FCC Rules were made for someone else to follow, not for him!

As Mr. Brown puts it, these customers "just won't take our advice or council on matters pertaining to the Rules and Regulations as set down by the FCC. After three to five times harping on the same subject they still think I'm trying to make much ado over nothing. One customer even said I sounded like a repeat record."

From the comments received here which originate all over the country, this and similar problems are widespread. Up until just recently, much of the cause appears to have been the fact that the FCC had little available in the way of enforcement weapons. About the only thing they could do was to revoke the license of the offender — and this, rightly enough, was considered too severe a punishment for "minor" infractions of the rules.

Now, of course, the licensee (and in some cases the operator too) can be nicked from $100 to $500 for such infractions — and the Commission has lost no time in informing the non-broadcast world that it intends to use this new enforcement power.

But not all the blame must rest on the weak enforcement ability which had characterized the industry. All of us users of radio had to start sometime — and where did we learn how to do it right? Most of us, I'm sure, learned from the fellow who sold and/or serviced our first units!

Or, in other words, we as an industry must share the blame — because we haven't worked hard enough to instruct our newer customers.

In line with this way of thinking, Mr. Brown asked about the availability of reprints of certain articles which have appeared in past issues of CH, which he could distribute to all his customers.

We've done quite a bit of thinking along these lines. It's not really as simple as it sounds; these reprints *do* cost money, and they also take considerable time to produce properly. It definitely is *not* just a simple matter of taking the plate for one or two pages of an issue, putting it back on the press, and banging off a thousand or so extra copies!

In small quantities — such as most shops would probably want — the price becomes prohibitive. I wouldn't even want to quote it, it's so high.

But in large (3 to 5 thousand at a whack) runs, the cost *per copy* comes down within reason.

Naturally, nobody would want 3 to 5 thousand reprints of a single article — but maybe 30 to 50 shops over the country might want 100 each.

This is not any kind of a firm offer — and most definitely is *not* a grant of permission to anyone else to reprint our material — but if enough of you would like to have such material available, drop me a line. Tell me which item you would like, how many copies you would want, and about how much per copy it would be worth to you.

This wouldn't be considered an order of any sort; it simply would tell me when enough people were interested in a particular item to make it possible to reprint it. At that time, I will drop each interested person a note telling him what the actual cost to him of the reprints would be, and waint for confirmation before going ahead.

If you think this sounds like a lot of work, you're right. But the non-broadcast field has to clean house — and if you're interested in helping clean this house, join me in the work!

What do you think? **—jk**

OCTOBER, 1962
Volume 2, Number 10

Communication HORIZONS

and "Two-Way Radio Digest" Published Monthly by
HORIZONS PUBLICATIONS, P.O. BOX 1557, Oklahoma City 1, Okla.

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OUR COVER:

A familiar sight to most users of non-broadcast radio is that of a technician going up the tower. The man on the cover is climbing Rohn's new No. 80 model, designed for microwave or even broadcast application, and capable of reaching the 800-foot height mark.

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Communication Horizons Magazine is read monthly by nearly 10,000 two-way communication engineers, technicians, installers and users. Detailed circulation breakdown available upon request.

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AND WHAT'S HAPPENING WITH YOU THESE DAYS?

For months now, we here at COMMUNICATION HORIZONS have been telling you what we are up to. Now, we'd like to know what's going on in **your** shop. What are your current problems? What tricky jobs have you accomplished lately? **What's new?**

We ask this for two reasons. One, if you tell us what **you** are doing then we will be able to better serve you by bringing you the information you need. And two, **your** activities, problems, and accomplishments may be news in themselves, helping other people in the industry.

To make it easy for you, we've prepared the card below. Just fill in any of the blanks which may be appropriate, drop it in an envelope, and airmail it to Communication Horizons, P. O. Box 1557, Oklahoma City 1, Oklahoma. Today is the day to do it!

Communication report for the period ______________ to ______________.

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New antennas installed: ______________

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New base stations installed: ______________

New repeaters installed: ______________

New systems installed: ______________

Current problems: ______________

Plans for next 30 days: ______________

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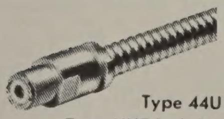

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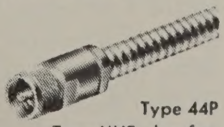

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Type UHF plug for
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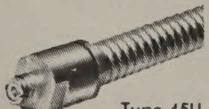
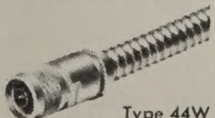


Type 45U
Type UHF jack for
⅞″ Foam Heliax



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Vice President, Engineering
Metrotek, Inc.
Raleigh, N. C.

Selective Calling

Since the beginning of two-way radio the desire for some form of selective calling has been present. Any two-way radio system is basically a gigantic party line which at times may have several hundred users sharing the same radio channel.

The well developed selective dialing systems used throughout the world by telephone companies have serious limitations when an attempt is made to use them in two-way radio. First, "on-the-air" time is valuable and the 8 to 30 seconds required to dial a normal telephone is prohibitive on a heavily used channel. Second, try dialing a telephone in a car in heavy traffic; it is dangerous, to say the least. Third, the telephone dial is a wonderfully simple encoder, but pulse decoders are expensive and tricky.

Regardless of these problems some use is and has been made of standard telephone dial system selective calling in two-way radio, primarily by the Bell Telephone System. At least one firm, Secode, also manufactures equipment for commercial use. Representative prices are $125 for an installed encoder (dial) and $175 additional for the decoder to give a full two-way dial system. Both transistor and vacuum tube models are available. Installation is relatively simple in conventional commercial two-way equipment but performance in low-power Business band (27 Mc) equipment is poor due to the similarity of dial pulses and ignition noise.

The major advantage of dial systems is the enormous code capacity and falsing protection. Decoders in current use permit over one million exclusive codes. Most decoders used are electro-mechanical devices with the code combination readily changed by moving the location of small metal pins. A completely transistorized decorder, actually a small computer, is also available through ITT Kellogg but the price is quite high, approximately $300.

By far the most useful and widely used commerical selective call system is the CTCSS or continuous-tone low-frequency squelch system. In this system a very stable tone between approximately 50 and 170 cps is transmitted at low level whenever the transmitter is keyed. The tone level is usually about 1/7 to 1-10 of normal voice level. The receiver squelch is controlled by the presence of the tone rather than signal strength alone and will respond only to that particular tone frequency used in the system.

Since the tone frequency is below the frequencies useful in speech transmission it is possible to filter out the tone from the speaker so that the operator is not aware of its presence. The major problems with this system are its complexity and thus its cost, and the limited number of tone codes available. Due to many reasons only about 30 tones may be used on any given radio channel.

Typical trade names are Motorola "Private Line" and General Electric "Channel Guard." Virtually all manufacturers of commercial two-way radio equipment offer this system at prices from $100 to $200 for each encoder-decoder in addition to the radio equipment. CTCSS selective call has one major advantage: the operator does not have to dial or switch anything; operation is completely automatic.

In many applications a serious problem is the fact that interference automatically disables the receiver resulting in operator confusion on a usy channel since he does not hear the interference. Today resonant reed oscillator controls and resonant reed relays are used almost exclusively as the tone generators and decoders. Some manufacturers formerly used elaborate electrical circuits to perform these functions but stability problems have led to universal use of resonant reeds.

Use of the CTCSS system in Business-band radio is not likely, due to the limited number of tone channels, cost and technical requirements. Extensive modification would be required to add the tone notch filter, eliminate noise limiter distortion and reduce total transmitter and receiver distortion to a few percent. This last problem is severe since any intermodulation distortion will produce annoying tone harmonics in the voice frequency range which cannot be filtered. 60, 120 and 115 cycle hum power supplies will also unlock many tone channels.

One of the simplest and oldest selective call systems is the single-frequency tone-burst system. Virtually all major commercial two-way radio manufacturers have or still do offer this accessory and several other manufacturers, notably Heath, Johnson and Morrow, currently offer it as an accessory. In addition, two non-two-way manufacturers (Radson, and recently Polytronics) offer it as a built-in accessory.

This system has little use today in commercial systems due to the problem of false triggering or long tone bursts and in most cases the necessity of some additional operator action to initiate a call. Even in commercial FM systems heterodyne squeals are not uncommon and in Business-band radio during "skip" are the rule rather than the exception.

A single tone system can only distinguish between this interference and its tone frequency by making the tone selectivity high and increasing the time the tone must be present at the right frequency to trigger or unlock. An improvement in tone selectivity requires a resulting increase in the frequency accuracy and stability of the tone generator which means additional cost. An increase in signaling time means more on-the-air time to call and if it exceeds approximately 2 seconds means an automatic timing circuit since few operators will correctly time manually over 1 second. Voice frequency (200-3000 cps) tones are commonly used to avoid the extensive modifications of other systems.

The advantages of the single-frequency tone-burst system are many: Relatively low cost, ease of installation, fair code capability and simplicity. In the asence of interference they do an excellent job. Over codes are practical in the 200-3000 cps range. Commercial grade units cost approximately $40 plus installation for an encoder and $60 plus installation for a decoder. Hobbyist units which may also be used commercially are usually both encoders and decoders and range from $35 in kit form to $60 plus installation wired. In at least one case up to four tones may be front panel selected.

Most single-frequency tone-burst systems today use resonant reed devices for both generation and decoding due to their high stability and selectivity. Band widths of 0.1% can be readily obtained in commercial grade units and no tuning is required. A factor to consider is the high replacement cost of resonant reed devices. If your tone frequency must be changed each reed assembly will cost $8 to $25 in small quantities depending on the type.

Conventional coil-capacitor tuned-circuits have also been used and offer the advantage of relatively inexpensive frequency change. Selectivity is limited by practical considerations to about 1% and temperature drift is a severe problem unless very expensive components are used.

Multiple-frequency tone-burst systems appear to be the most practical solution where freedom from falsing and high code capability are desired. Two possible systems are available: Sequential and simultaneous tone code transmission. For the sequential system shown that 12 different tone frequencies used in groups of 4 in a 4 tone sequential system would give 11,286 cobinations or separate codes.

If 12 different tone frequencies used in groups of 4 in a 4 tone simultaneous system were used it would give 445 combinations or exclusive codes.

Since over 200 separate tone frequencies are possible in the voice frequency range either the sequential or simultaneous tone group systems are capable of a number of exclusive codes far beyond practical use even when only two tone frequencies are used.

Sequential tone groups are widely used commercially where protection from false triggering is mandatory. Typical uses are turning on rural fire station sirens from a remote point, oil pipeline valve control and missile destruct commands. The sequential system is expensive since in practical systems each tone used must have a continuous oscillator. Encoders range from $150 to over $3000. Decoders are considerably less expensive, approximately $60 to $100 plus intsallation for commercial units. Resonant reed devices are used almost without exception.

Until recently, few simultaneous multiple-frequency tone-burst systems have been used due to the lower number of possible cominations. Recent advances in resonant reed devices have made it possible to generate up to four tones simultaneously at low cost. The extensive work in computers of the last 15 years has produced coincidence circuits ("and" circuits) which result in decoder action only when a numer of the exact tone frequencies are simultaneously present. Such a system is almost immume to falsing since the probability of several tones of exactly the right frequency being simulteneously present is very remote. As few as two tones give excellent protection. An advantage over the sequential system is that audio tones rapidly varying in frequency will

(Continued on Page 11)

Why Crystal Ovens?

J. A. McCormick, G-E Communications Products, Lynchburg, W. Va.

It is a sad commentary that the mobile communications industry still receives entirely too many obsolete specifications inviting bids that call for the use of crystal ovens in order to obtain 0.0005% stability.

There is nothing wrong with the requirement of 0.0005% frequency stability over the temperature range. In fact, it is an FCC requirement of high-band transmitters, but obtaining it through the use of crystal ovens is just a habit — a remnant of the past at the present state of the art. A crystal oven operates the crystal at essentially the highest temperature to which it is ever exposed.

Crystal Aging

Although a good modern crystal should stand temperatures for appreciable periods without damage, everything which can go wrong happens faster at elevated temperature. (For example: Chemical reactions double in rate for every 10 degree C temperature rise, so a reaction at 85° goes 64 times as fast as the same reaction at 25° C). It stands to reason that it is prudent to operate every component at the lowest practicable temperature — including the crystal.

At the present state of the art, crystal ovens are necessary only in equipment that has significant within-the-case heat rise (that is, in tubed equipment) which increases the total temperature range over which the required stability must be maintained. Figure 1 tells the story.

The standard accepted operating temperature range of mobile radio equipment is —30° C to +60° C. In mobile units using tubes throughout, the within-the-case temperature rise may approximate 40°, therefore, the total temperature spread to which the crystal is exposed is 130°. Many tubed equipments have a heat rise as much as 60° C.

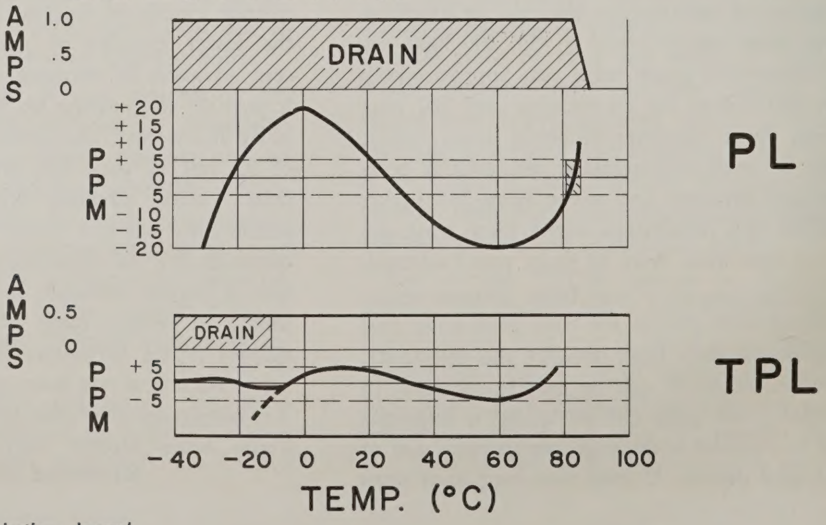
In newer equipment, the transistorized portion of the cabinet has a heat rise of only 5°; therefore, the total range to which the oscillators are subjected is 95°. The 25° difference in the two types

(Continued on Page 17)

THE PROBLEM...

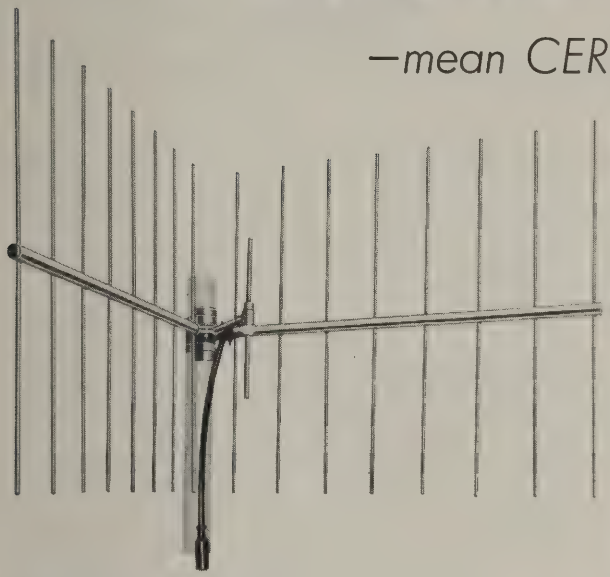
		50 MC	175 MC	450 MC
±20 PPM	(0.002 %)	±1.00 KC	±3.40 KC	±9.00 KC
± 5 PPM	(0.0005 %)	±0.25	±0.85	±2.25
± 1 PPM	(0.0001 %)	±0.05	±0.175	±0.45

THE SOLUTION...



C·P COMMUNICATION ANTENNA SYSTEMS

—mean CERTIFIED PERFORMANCE!



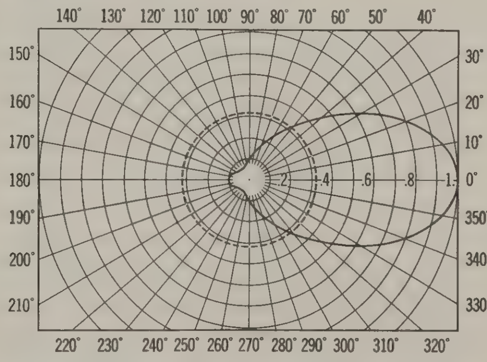
Base Station Corner Reflector Advanced Design Antenna

(10X-Unidirectional Gain)

Cat. No. 161-509, Frequency Range 450-470 MC

Cat. No. 161-509 Corner Reflector Antenna is designed for use in the 450-470 Mc band. All reflector screen components are manufactured of high strength aluminum alloys, all mounting components are fabricated of hot-galvanized steel and all radiating components are fabricated of aluminum. The above combine maximum strength, optimum electrical performance and minimum weight for the first time in an antenna of this type.

This lightweight aluminum antenna is ideal for use in multiple corner arrays.



Horizontal field strength pattern of Corner Reflector 10X-Gain Antenna Cat. No. 161-509. A dipole pattern is shown for reference.

Electrical Specifications:

Nominal input impedance	50 ohms
Forward gain	10 db
Front-to-back ratio	20 db
Maximum power input	250 watts
Internal feedline	RG-8A/U
Flexible terminal extension	18″ of RG-8A/U
Termination	Type N male with Neoprene housing
VSWR	1.5:1
Bandwidth	±3%
Lightning protection	Direct ground

Mechanical Specifications:

Reflector (size per side)	2′ x 2′
Reflector material	High strength aluminum alloy
Radiating element material	High strength aluminum alloy
Radiating element diameter	⅜″
Rated wind velocity	100 MPH
Lateral thrust at rated wind	16 lbs.
Torsional moment on mounting pipe	16 ft. lbs.
Weight	8 lbs.

Stainless steel hardware supplied to mount antenna on 2″ IPS pipe.

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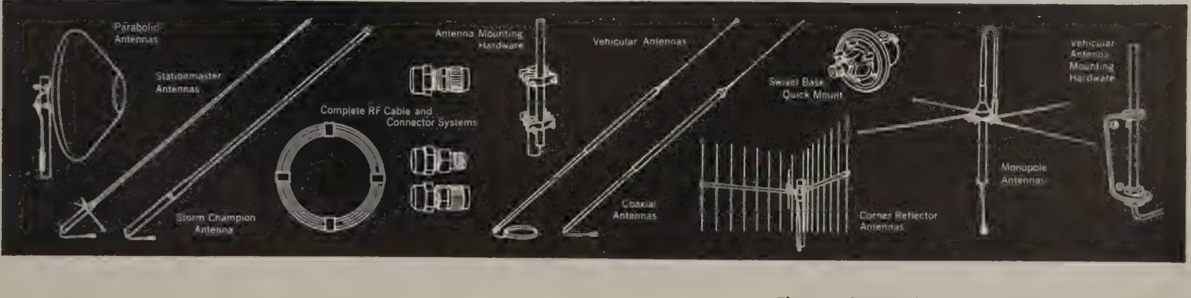
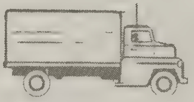
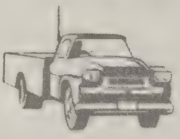
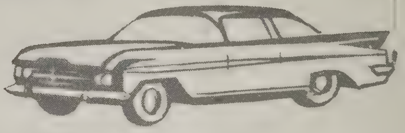


SHOP TALK





With
I. Kay Redd, Jr.
Servicing Editor



Many mobile radio users have the idea that even though they do not know how to repair their radio they can easily install their radio themselves. After all, it is only necessary to drill a few holes and mount the equipment in place. There are only a few connections to make, so the job should be fairly simple. This can save the user a lot of time and money; he is sure that the $25 to $35 the service shop charges is way too much because the job shouldn't take more than a couple of hours. Even if he concedes to having the installation done at the service shop, he knows that the least he can do is remove the installation from the old vehicle.

This, of course, is not true — because a person not experienced in mobile installations will undoubtedly make some serious mistakes that can cause damage to the radio or prevent it from operating properly. As far as removing an installation is concerned, a do-it-yourselfer will make some mistake in every case. He will probably leave some important item in the vehicle, lose part of the equipment, or damage something (such as cutting the control cable in half instead of unplugging it). When we quote a price on a reinstallation, this price includes removal and we do not reduce the price if the customer removes the radio himself. Essentially this means the customer is getting the removal at no charge which discourages him from doing the job himself.

Where a shop is doing ten or more installations a week, there should be a man who is an installation specialist and who does nothing but installations. He does not have to be a licensed radio technician, but he must be a good mechanic. A technician must be on hand for technical held during the installation and to check out the radio after installation.

It is usually advantageous that installations be done at the service shop rather than at the customer location. The service shop should have an installation area where all installation tools and parts may be kept. This should include small tools, drills, a good vise, drill press, and possibly a welding torch. In addition, it is important to have an ample supply of nuts, bolts and screws of various sizes and strips of galvanized band iron to make braces and brackets.

The first most important thing in an installation is to make sure all connections are tight and that wire sizes are correct. If screws are not tight on a fuse block or relay assembly, there will be a voltage drop at that point which will seriously impair the operation of the radio. The primary connections for the radio should not be made directly to the battery terminals, but should be made at the ground point and hot point (usually starter solenoid) to which the vehicle battery cables are connected. The vehicle battery cable lugs are made of lead, but the radio primary cable have copper lugs which would be destroyed by battery acid.

The primary relay should be mounted with the connections on the bottom or else it may fill with water, which will ruin the relay. The relay should be mounted in such a place that it will not be in the way during routine automobile service, so be sure the oil stick will not hit any bare terminals. It is most important that no cables are run past sharp edges or they will be subsequently cut, causing a short circuit. The most common place for this to happen are under the back seat of a car and where the cable runs through the fire wall or other hole in the body.

Cables should stay away from brake or clutch pedals; what looks like a good space for a cable may be right where the brake pedal is pushed to. Cables should be kept away from the exhaust pipe or manifold which may be cold at the time of installation but will later be hot enough to burn the cable.

It is usually best to consult the customer or driver before mounting the microphone, control head, and radio unit. Of these three pieces, the radio until may be the biggest problem, especially in foreign cars, economy cars and trucks.

In foreign cars and economy cars there is so little space to begin with that the radio will consume a right big percentage of this space regardless of where it is put. In a Volkswagen the radio can be mounted behind the back seat.

Trucks can be much more of a problem. For example, in a dump truck there may be no room behind the seat because that is where the gas tank is. There is no room on the right side in the cab because the floor has levers on it and a large heater in front of the levers. It may be possible to mount the radio under the right hand seat, but the radio would then be very inaccessible for servicing.

In cases such as this we have found the solution is to mount the radio under the hood with the engine. There is usually plenty of extra space and the radio will be easily accessible. The radio is mounted on iron braces and legs bolted to the fender. We service radios that have been mounted in this manner for several years with no ill effects. The temperature under the hood is not as high as it is in the trunk of a car; the case may be soiled somewhat by mud and oil, but this can easily be wiped off. The case does not need to be water proof.

Usually fire trucks must have waterproof cases for the radio, but since fire trucks are usually custom built, the manufacturer can provide a case or compartment when it is built. In a Thunderbird we mounted the radio in place of the spare tire. In case of a flat, the driver can use the radio to call for help.

Low-band antennas should be mounted toward the left side of a vehicle so they will not be likely to hit by tree limbs. In general the antenna should be mounted as high on the vehicle as possible which should result in better radiation with less directional characteristics. If the total height above ground exceeds twelve feet, there will probably be cases when the antenna will hit low bridges tree limbs, or telephone wires. A service shop should have on hand several types of low band antennas to substitute where necessary (for an additional charge). This would include a bumper mount (Antenna Specialists ASP-143), a type for double shell bodies where it is not possible to reach the inside of the vehicle body at the point where the antenna is mounted (ASP-161), and many service shops have obtained excellent results using the roof mounted base loaded type (ASP-268).

For maximum coverage, a quarter wave high band or UHF whip should always be mounted at the center of the roof of a vehicle rather than on the trunk lid or fender. Instead of the quarter wave whip one of the mobile gain antennas may be used in which case it may be mounted on the trunk lid or fender. For high band, the best we found is the "Lewis Whip" made by Prodelin. This antenna is rated at 2.5 db gain over a half wave dipole. It is extremely rugged and is easily tuned by moving a coil tap.

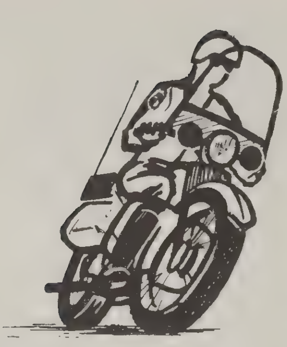
Except when the antenna can be tuned by moving a coil tap, it is most important to cut the antenna to the right length. For a quarter wave roof top whip it is reliable to use the cutting chart provided with the antenna in most cases. A full size scale can be drawn on the shop wall to facilitate measuring whips. For low band the charts are seldom accurate enough and the antenna must be cut to suit each individual installation. This can easily be done by using an adjustable test whip (ASP-196) to determine length. After the antenna is installed, the back power or standing wave ratio should be checked with the trunk closed, all car doors closed, and preferably out doors. The VSWR should not exceed 2.0 to 1.

At this point consideration should be given to ignition noise, which of course can be quite a problem below 50 megacycles. In many cases it is sufficient to use a resistance wire between the coil and distributor, a co-ax type by-pass on the key side of the coil, and a co-ax by-pass on the generator armature. Most new passenger cars are already sufficiently suppressed. The worst offenders are probably Ford trucks. It will help if the radio wires and cables under the hood are kept as short as possibe.

It may be necessary to bond the hood, exaust pipe or other parts of the body. Sometimes it helps to run a braided shield over the wires between the generator and voltage regulator. Resistor type spark plugs help considerably. Before spending a lot of time eliminating the source of noise, be sure the radio is properly aligned. The final alignment may be improved by the use of a noise generator used in conjunction with the signal generator (phase tuning).

There is no point in attempting to eliminate 100% of the ignition noise because in the first place it is impossible to do so and in the second place the receiver will still pick up noise from other vehicles. The only solution to this is a noise blanker (C.H., April '62).

To complete the installation all loose wires and cables should be neatly taped with friction tape. This takes very little time but can mean the difference between a neat job and a sloppy job. ■



PUBLIC SAFETY COMMUNICATIONS

by Robert E. Brooking, Communications Engineer — City of Burbank, California

Last month this column was devoted to a report of two important talks presented at the APCO Conference in Clearwater, Florida. There were many other things that took place but it was felt by your editor that the biggest problem facing the Public Safety Radio Services was lack of operating space.

Mr. Gifford thought so too, and in completing his talk, he brought out two important points: Under proper spectrum management police radio might have 25 to 35 Mc of space reserved for mobile service. Today it has about 6 Mc between 25 and 890 Mc. All of Part 10 (Public Safety) has 1.8% or 15.5 Mc.

For his second point, he asks a question: "Should spectrum be allocated on proven need or what should be in the public interest? In the Land Mobile bands, the allocations have been derived from need. In the FM and T.V. Broadcast bands, they have been derived from someone's idea of what should be in the public interest."

Mr. Gifford continues: "In the case of police services, I wonder whether we have thought big enough about what the spectrum can do in providing better police services — greater protection of human life and property. I leave you with the question, but I also call to your attention that the implementation of your answer will require a change in approach and philosophy in radio spectrum management. That is why this subject is important at APCO."

Your editor will add that it is equally important to Fire, Forestry Conservation and the other services in Part 10. They are all a part of our Internal Security. Do you have the duty of providing such a system? Then you will probably be interested in obtaining a copy of Mr. Gifford's talk. Just write to D. T. Brooks, National Convention Director, General Electric Co., Lynchburg, Va.

While on the subpect of spectrum management, perhaps it would be advisable to consider the words of another speaker at the APCO Conference: F.C.C. Public Safety and Amateur Division Chief, John J. McCue. Mr. McCue advised that the licensees in Public Safety can expect a visit from the F.C.C. Inspectors soon and that under the new power granted the Commission to levy small fines, there will be some money changing hands. He went on to point out that both the licensee and the operator may be subject to fines; *i.e.*, the dispatcher who doesn't bother to give proper station identification may be paying the Commission $100 for the privilege.

In regard to matters of frequency coordination, Mr. McCue asked that the various groups responsible for providing frequency advisory service give the Commission their views on the Commission including limitations on effective radiated power, antenna height and geographical coordinates on the license when it is issued. At the present time many recommendations are made on the basis of engineering studies and include such limitations; but it has been left to the good faith of the licensees to uphold the agreements.

Mr. McCue announced that: "the Commission is pleased" with the establishment, last April, of the Public Safety Communications Council. He continued that it is his hope that the second meeting, to be held in Chicago in October, will set up definite proceedures for accomplishing coordination of applications in the Local Government Radio Service.

Also mentioned was the fact that unless such procedures are developed, then effective November 1, 1963, all applications for licenses in the Local Government Radio Service will require inclusion of a report based on a field study regarding probable interference to stations within 75 miles and 30 Kc.

In regard to the date, November 1, 1963, Mr. McCue also stated that the Commission intends to deny any requests for waivers for permission to operate fire radio systems on police frequencies after that date. He added that the Commission has allowed more than five years for the change which should be sufficient.

Attending the Conference was International Municipal Signal Association President Kenneth W. Smith, Director of Traffic, City of Alexanderia, Virginia. Mr. Smith spoke of the importance of communications to city, county, state and federal governmental entities.

In his words, radio communication is as important to the fire and police services "as the fire hose and the gun." President Smith took time to pay a personal tribute to President Marshall of APCO for having taken the initiative in calling the meeting last April that resulted in forming the Public Safety Communciations Council. He expressed the hope that other groups representing "'highway and traffic people" will join in making the Council truly representative of all the Public Safety Radio Services.

Of the almost 400 people attending the Conference, 117 were accredited delegates attending from 31 states and Canada, from Vermont in the northeast and Florida in the southeast to Oregon and California in the far west.

Among the items of business considered by the Conference was the adoption of a completely new Constitution and set of Bylaws. A committee chaired by Rhett MacMillian, Communications Officer, Florida Game and Fish Commission spent more than 500 hours preparing this document.

Mr. MacMillian was elected 3rd Vice President by the delegates. Mr. Jacob R. Bowers of the Missouri Highway Patrol was elected 2nd Vice President. Mr. Frank Campbell of the City of Indianapolis was elected 1st Vice President. Harvey O. Platt, Director of Communications, Riverside County, California was elected President to succeed Captain Marshall of the Virginia State Police. Mr. Howard Black of the Mobile, Alabama Police Department was again elected Secretary-Treasurer and Robert Mix, Editor, APCO Bulletin was reelected to that position.

Not all of the conference time was taken up with the weighty problems of the moment. Dr. Dan Noble, Executive Vice President of Motorola, took time out from our current problems to depict some of the things with which we will be dealing in the next fifty years; or so it seemed at first. Perhaps it is just as well that Dr. Noble's talk was meant to be on the humorous side.

Another most interesting talk was given by the Guest Speaker at the Annual Banquet, Dr. Lester Hale, Head of the Department of Speech, University of Florida. Dr. Hale has been heard by APCO before. This time he choose "Personal Communications" for his theme. Lest somebody gain the impression that this is a further commitment of our already overcrowded land-mobile channels, it is not. The Doctor was dealing with the subject of choosing the proper words to convey our thoughts to other people.

In a classic example, he tells of attempting to contact a friend by telephone; the Chief of Police of a nearby city. The officer answering the call said: "Just a moment." Shortly he returned to say: "I'm sorry but the Chief is tied up in the back room." Now, obviously no one had "tied up" the Chief. Let us say that the Chief was busy. But the big point of Dr. Hale's talk is our seeming lack of ability to convey our thoughts to others.

It is the sincere hope of your editor that this column has succeeded in making clearer to all of those working in Public Safety communications, the problems we face and some possible solutions to these problems. ■

Calling . . . Page 5

not false the decoder. Particularly in high frequency long distance systems varying heterodyne frequencies are a common occurrence.

Only one such system ("Monocall") is currently available and is one of the lowest cost available. Encoders (6 codes) are less than $30 plus installation and a combined encoder-decoder (6 codes) may be purchased for less than $60 plus installation. Patented circuits eliminate the necessity of any vacuum tubes or transistors and resonant reed relays are used. This system will probably be widely used commercially.

Another system under development by many companies is digital pulse code. As a result of advances in computer circuitry and IFF (identification, friend or foe) it appears practical to design completely electronic digital systems.

The advantages are: very high code capability, automatic operation, low power drain, excellent false triggering, short calling time and reliability. The major disadvantages are very high cost, currently $300 to $2000 for an encoder-decoder and large bandwidths in the communications equipment. Pulse width and pulse position modulation are both under investigation. No commercial units are in production although several military systems have recently been announced. ■

CH Visits Decibel Products

On a recent swing through the southwest Publisher Bob Cooper had an opportunity to visit and inspect the plant of DB Products, located at 3184 Quebec, in Dallas, Texas. The DB Products plant site is located in a rapidly booming and expanding commercial park area of Dallas. The plant is new in appearance and modern in design! But of greater importance, the products the firm manufactures have a reputation for quality that is to be envied.

DB Products Model 286 directional base station antennas nearing completion by one of the firm's technicians. The antennas are constructed individually with the elements and fittings cut from jigs and assembled piece by piece.

DB Products antennas are of the base station variety, covering the 30-50, 148-172 and 450-470 megacycle communications bands. Recent new products also include antennas and accessories in the 960 megacycle region.

Recently DB Products has developed a line of Diplexers for the 150 and 450 megacycle two-way bands, which allow use of a single antenna system for both transmitting and receiving.

While Cooper was at the plant he snapped a few photos of the operation, including some tests at the antenna test site of DB's model 286 directional station antenna, consisting of twin three yagi arrays phased for forward gain.

As each antenna is completed it is mounted on a test stand near the DB Products plant and lashed down for VSWR and resonance checks.

A production run on DB-460 circular pattern or directional pattern base station antenna for the 450-470 megacycle band was in progress at the time of the visit. One of the interesting features with the antenna is the completely encapsulated feed point which provides a high degree of protection from the weather elements.

DB Products Sales Manager Fred McDaniels pointed out that sufficent production quantity is maintained so that all of the more popular antennas, *i.e.* those most often required, are available for shipment from stock.

One of the most impressive features of the DB Products tour was the testing program which insures that every single antenna shipped has been tested for VSWR and resonance before it is shipped. McDaniels noted "this guarantees the customer that the array he purchases will be ready to put on a mast or tower and attach to a feedline without any need for field tuning, when he receives it."

DB Products technician keeps one eye on this VSWR indicator (under the canopy) and the other on his driven elements as he adjusts for maximum VSWR and checks the pattern on this twin three array.

This close-up of a DB-406 unitized dipole assembly shows the encapsulated epoxy surrounding the feedpoint on the antenna. Each feedpoint on all DB Products antennas is encapsulated to protect it from weather and corrosion. All phasing line junction boxes are also protected in a similar way.

by Robert E. Tall
Chief
Washington Bureau

FCC SAFETY, SPECIAL SERVICE BUREAU REORGANIZED

In line with results of an earlier management survey, the FCC's Safety and Special Radio Services Bureau has been reorganized.

Administration of the Amateur service was removed from the bureau and placed under a new organization, titled the Amateur and Citizens Division.

John J. McCue remains as chief of the renamed Public Safety Radio Division. Offices of Safety-Special Bureau Chief Curtis B. Plummer and assistant chief Irving Brownstein were unaffected.

Primary effect of the reorganization was to transfer specific services between divisions. Staff personnel who had been assigned specific services under the former organization were transferred also, retaining their specific assignments.

'THIN ROUTE' MICROWAVE SUPPORTED

Support for late July FCC proposals to divide the 2110-2200 Mc band into narrow segments for use by "thin route" microwave systems has been filed by the American Petroleum Institute's central committee on communication facilities and by Aeronautical Radio, Inc.

The API filing termed the proposals "a progressive refinement of the basic principles and policies" handed down by the Commission in earlier microwave action (docket 11866).

Arinc hailed the proposal as a possible means of clearing frequencies below 952 Mc for mobile use.

Most of the comments expected on the proposal are not anticipated before the latter part of September, since deadline was extended to Septemeber 25.

ISM RULE AMENDMENTS HAILED

Forest Industries Radio Communications, in comments on the FCC's mid-July proposals to amend ISM rules in such a way as to reduce downtime of ISM equipment after elimination of interference, has termed the proposals "a welcome move giving relief to all involved."

The new rules proposed would allow permission to resume operation to be obtained from Commission field offices by telephone, rather than in writing, pending filing of necessary reports.

TAXI RADIO RULE CHANGE ASKED

A change in Taxicab Radio Service rules to spell out more clearly permissible use of radio dispatching in package pickup has been requested.

The petition, filed jointly by the National Association of Taxicab Owners and the American Taxicab Association, asks that rules be changed to provide specifically that "mobile station facilities, installed in a taxicab motor vehicle that is used not only for the carriage of passengers for hire but also used at times on a secondary basis for the carriage of parcels, packages and like items of property in lieu of passengers, may be used for the efficent operation of such transportation of property."

The associations explained that wording of present rules are "not altogether clear" as to whether such use of taxicab radio is legal, and as a result many cab operators are avoiding use of radio in parcel pickup situations.

The associations continued that they believe the rules "were not intended to prohibit" this use of radio, and explained that the proposed rule change is intended to spell out more clearly the intent of the present rules.

25-42 Mc REPLY DEADLINE EXTENDED

The FCC has extended until November 30 the deadline for filing reply comments on its proposals to service-allocate mobile radio split channels in the 25-42 Mc bands.

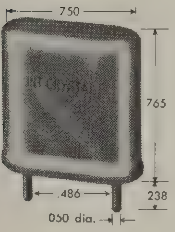
The action was taken on request of APCO and the International Association of Chiefs of Police. Previous deadline for reply comments was August 1.

DELAY ASKED ON NEW TOWER RULES

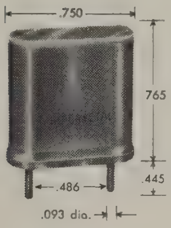
The API has formally requested the Federal Aviation Agency to hold off on its new codification of Part 626 of FAA regulations (concerning

Custom made CRYSTALS

FREQUENCIES 70 KC TO 137 MC



F-605



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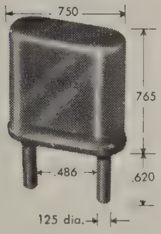

F-612

DESCRIPTION AND DATA:

All of these crystals are of the plated, wire-mounted type. Low drift AT-cut blanks are used in these units above 500 KC, and low drift DT and CT-cut blanks are used in units below 500 KC; any crystal can be supplied for operation with or without an oven.

TEMPERATURE TOLERANCE:
AT—±.005% from —55° to +90°C.
±.002% from —30° to +60°C.
DT-CT—±.01% from —40° to +70°C.

CALIBRATION TOLERANCE:
Supplied to meet equipment manufacturers speifications and may be as close as .001% without oven or .0005% with oven. Where no equipment is specified the following will apply.
AT— .0025% of nominal at +30°C.
DT-CT— .01% of nominal at +30°C.

DRIVE LEVELS:
Maximum, AT—
10 milliwatts 500 KC to 999 KC
4 milliwatts 10,000 KC to 24,000 KC
2 milliwatts 25 MC to 137 MC
DT-CT—2 milliwatts

CIRCUIT: As specified by customer. Crystals are available for all major two-way equipment and in most cases the necessary correlation data is on file. Where circuit is not specified, the crystal will be calibrated for operation into a load capacitance of 32 mmf.

FREQUENCY RANGES AND MODES OF OPERATION

200-500 KC:
Operates on fundamental edge shear oscillation. Load capacitance 32 mmf . . . or as specified by customer. If load is not known specify circuit or equipment in which crystal will be used.

500-20,000 KC:
Operates on fundamental face shear oscillation. Load capacitance 32 mmf . . . or as specified by customer.

10-60 MC:
Operates on third mechanical overtone at anti-resonance. Will give reasonable output in tuned circuit.

60-100 MC:
Operates on fifth (or seventh) mechanical overtone at series-resonance. Drive level must be kept below 2 milliwatts.

ONE DAY SERVICE

Orders for less than five crystals are shipped within one working day following receipt of order (except low frequency and special crystals which require 10 to 30 days for processing). Orders received on Mon. thru Thurs. will be shipped the day following. Orders received on Fri. will be shipped the following Mon. Postage is prepaid within continental U.S. when cash accompanies order. All others are shipped F.O.B. Oklahoma City.

SUPPLY THIS INFORMATION WHEN ORDERING

MOTOROLA: Crystals can only be properly correlated for Motorola equipment if the crystal type number is given. Example: D02, R28, D03, etc. In cases where crystals are required for type D-14, 800 and 801 holders, always specify crystal frequency or the high IF frequency. Check whether the crystals are to be used in ovens.

GENERAL ELECTRIC: Specify model number of transmitter and receiver RF Decks. Example: 4ES13A3, 4ER24B1, 4ET5B3, etc. When ordering crystals for 450 MC equipment specify:

Receiver Crystals:
A. If they are heated or non-heated.
B. If the unit is AFC or NON-AFC Controlled.
C. Platter number of present receiver deck.

Transmitter Crystals:
A. If they are heated or non-heated.

R.C.A.: Specify model number of unit or MI Number of the crystal. Always indicate whether crystals are to be non-heated or heated type.

OTHERS: Specify model number of the receiver and transmitter as well as any formulae that pertain to the correct crystal calculation.

PRICES — F-605, F-609, F-612 CRYSTALS

Fundamental KC		**Fundamental KC**		**Overtone MC**	
200 - 499*	**$12.50**	3000 - 3999	**$5.75**	10 - 34.99	**$ 6.50**
500 - 849*	**15.00**	4000 - 5999	**5.00**	35 - 44.99	**7.00**
850 - 899*	**13.50**	6000 - 9499	**4.50**	45 - 60	**8.50**
900 - 999*	**12.50**	9500 - 10999	**5.00**	61 - 75	**10.50**
1000 - 1499†	**9.80**	11000 - 14999	**6.30**	76 - 137	**15.00**
1500 - 1999†	**7.50**	15000 - 20000	**8.00**		
2000 - 2999	**6.50**				

*Allow 10 to 30 days for processing. †Allow 2 to 3 days for processing.

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radio tower height) until changes are made in the requirements for notification procedures for antenna towers.

While some changes have already been made, the API said, one "important and still unresolved" problem concerns the notification requirement for all structures more than 150 feet above ground or water level.

API asked that recodification be delayed until anticipated new rules regarding antenna tower height are made effective, thus reducing a "burdensome" administrative task for all concerned.

FCC OPPOSES 'EARMARKING' OF FUNDS

The FCC has registered flat opposition to the House requirement that it use fiscal 1963 funds to add 12 positions in the safety-special radio services field.

Commission spokesmen asked that they be given flexibility in administering their budget.

During the legislative appearance by Commissioners Ford and Lee, Sen. Allott (R-Colo.) brought up the Commission's filing fee proposals, commenting that he had received numerous complaints from constituents. He was told that an analysis of the many comments received on the proposals should be available for Commission action by late October or early November.

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TELEPHONE COMPANY RCC PERMIT HIT

Application of the Bay Springs Telephone Co., a land-line firm, for a new common carrier radiotelephone system to be located near Laurel, Miss., has been opposed by Robert M. Keith, Jr., doing business as Monroe Radiotelephone Co. in Laurel.

Keith told the FCC he has been operating for nearly six years under an "exclusive certificate of public convenience and necessity" from the Mississippi Public Service Commission, and said grant of Bay Springs' application would result in "serious and irreparable" loss to his own firm.

He also told the Commission that Bay Springs has advised the FCC that "no franchise or other authorization is required by local law" but that, "on the contrary, the Mississippi statutes . . . specifically require a certificate of authority" and that Bay Springs "has not secured such authority from the Mississippi Commission."

HIGH-BAND MRS POWER LIMIT RAISED

Permissible power input for 152-162 Mc stations in the manufacturers radio service has been raised to 180 watts, in an FCC compromise between MRS requests and petroleum and forest products service licensees.

At the same time, the "yard area" concept which had been in effect for the MRS on these frequencies was abandoned.

The action came in a rulemaking proceeding which stemmed from a NAM CMRU petition asking "parity of power" for the three services on shared frequencies in the band.

Previously, MRS power limit had been 60 watts, while both petroleum and forest products stations were allowed up to 600 watts.

AERONAUTICAL MULTICOM SERVICE APPROVED

The proposed "Multicom" service (page 16, August CH; page 18, July CH) for air-air or air-ground communication not covered in previous rules has been established by the FCC.

As formalized, the service showed no changes from the original proposal despite a number of comments requesting such change.

"An authorization for an aeronautical multicom station," the new rules provide, "will be granted only to a person requiring communications within the scope of service for this class of station. A showing, satisfactory to the Commission, of the need for such communication shall accompany each application for license."

The new service will use the spot frequqency 122.9 Mc; type of emission is specified as 6A3; maximum power output is 10 watts. ■

of equipment makes all the difference in the world. We *must* use ovens in the tubed line; we do not *need* ovens in the transistorized line.

The two curves in Figure 1 shows that present-day crystals follow an S curve with the response curve becoming flatter as the temperature spread is minimized. The curves shown represent equally carefully cut crystals, except that the Progress Line crystals must cover a range of 130° while the TPL covers only 95°. The oscillator remains within 0.0005% all the way from — 10° C to 75° C.

Transmitters and reeivers are on frequency from the instant the set is turned on. It is only necessary to warm the oscillator from —30 to —10 in order to stay well within the 0.0005% requirement.

These curves show that a high band TPL transmitter or receiver never goes off more than 850 cycles from the instant it is turned on as long as the temperature is above freezing. Equipment which depends upon crystal ovens on the other hand goes off as much as 3½ kC — in the high-band until oven operating temperature is reached. This then is one of the evils of the use of crystal oven — warmup time.

Now it is true that in the low and high bands the equipment never moves out of the channel, in fact it never moves out of the channel in the 450 MC band. However, some distortion can be expected during the warmup period, and some users have even complained that their system is unusable for the first three minutes after the equipment is turned on.

Power Drain

Crystal ovens have another serious objection and that is in the matter of power consumption. The top curve shows that there is one ampere drain per oven all the way from cold temperatures up to 85° C. Compare this with the insignificant drain of TPL with temperatures below minus 10.

Thermostat Life

Another disadvantage of crystal ovens is that it is obviously difficult to manufacture a good thermostat in such a small space. The military recognizes this. The only mil spec on crystal ovens specifies 1,000 hours life to first failure. This means they expect the crystal oven combination to have to be replaced on routine maintenance after an initial life of 1,000 hours which is only a small part of a year. Such a short life would be intolerable in commercial equipment.

LOGBOOK

A CALENDER OF IMPORTANT MEETINGS AND EVENTS OF INTEREST TO MOBILE COMMUNICATIONS.

Submit items for this column to CH Washington Bureau Chief, ROBERT E. TALL at 1327 F STREET N.W., WASHINGTON 5, D.C.

Sept. 25—Deadline for comments on FCC proposals (docket 13712) to divide the 2100-2200 Mc band into narrow segments for "thin route" microwave systems and set up separate allocations for private and common carrier uses.

Oct. 1—Deadline for comments on FCC proposals reallocating the 6425-6575, 10550-10680, and 11700-12200 Mc bands so that specific portions will be exclusively for common carrier mobile uses and the remainder exclusively for private mobile uses.

Oct. 23-25—Annual meeting of Communications & Signal Section of Association of American Railroads. Sheraton-Chicago Hotel, Chicago, Ill.

Nov. 5-6—Annual meeting of Executive Committee of Forest Industries Radio Communications. Dallas, Texas.

Nov. 30—Deadline for reply comments on FCC proposals to service-allocate mobile radio split channels in the 25-42 Mc band and make revisions in present assignment of frequencies in the band (docket 14503).

Dec. 6-7—13th National Conference of Institute of Radio Engineers Professional Group on Vehicular Communications. Anaheim, Calif.

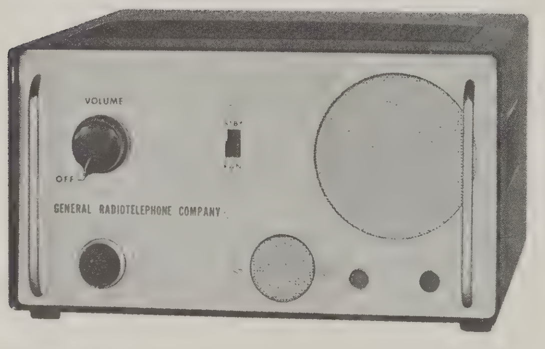
Jan. 1, 1963—Date when new revised FCC Form 505 must be used for Class B, C, or D Citizens radio applications.

Jan. 1, 1963—Effective date of merger of Institute of Radio Engineers and American Institute of Electrical Engineers into new Institute of Electrial & Electronic Engineers.

Oct. 31, 1963—Mobile radio users must meet full narrow band technical standards of FCC.

Nov. 1, 1963—Fire radio systems must move off frequencies allocated to the police radio service.

CH SHOWCASE



ANOTHER NEW FM LINE

Another new FM line has been added to the growing list of newcomers to the field with announcement by *General Radiotelephone Co.,* 3501 West Burbank Blvd., Burbank, Calif., of its entry into the non-broadcast equipment market.

The new General unit is dubbed the model FM-60; it offers 0.0005 percent frequency stability throughout the 150-174 Mc bands, with nominal 15-watt power output and 5-kc deviation (adjustable). The receiver portion features 0.5 microvolt sensitivity for 20 db quieting, and squelch sensitivity of 0.2 microvolt or less. The unit has been type accepted under parts 10, 11, 16, and 21, and is planned to sell for less than $350.

A companion remote-control unit, model RC-612, is capable of controlling all functions of the FM-60 and will sell for under $50.

For complete specifications, contact Mr. Oscar Shapiro at General and tell him who sent you.

NEW 150-Mc UNIT FROM RCA

New, compact 150 Mc mobile radios have been added to the Fleet Line equipment originally offered by the *Radio Corporation of America* for 450 Mc operation.

Marketing manager A. Fischer said the new models incorporate the same features which contributed to the success of the 450-Mc equipment: transistorized power supply for dependability, 6/12 volt interchangeability, and standby monitoring to reduce battery drain.

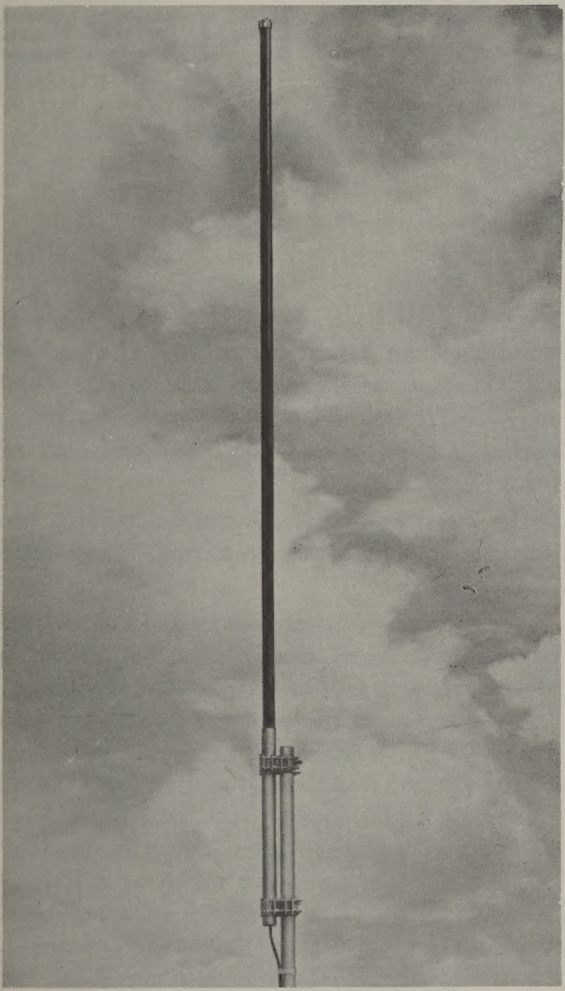
Details are available from RCA, 30 Rockefeller Plaza, New York 20, N. Y. Tell them where you saw this.

NO-CLIMBING TOWER ERECTION KIT

A novel kit allowing erection of guyed radio towers without the necessity of anyone leaving the ground has been announced by *Commercial Communications,* Division of The House of Insurance, Inc., Lombardy and Brook, Richmond 20, Va.

Invented by Charles H. Garrette, Jr., the "Kwik-Up Tower Erection Kit" allows a four-man team to erect a 150-foot steel tower in approximately 8 hours with no one at any time being more than 10 feet off the ground.

For full details, write H. Michael Ryan, president of Commercial Communications.



HI-BAND GAIN ANTENNAS

A new line of low-priced omnidirectional base-station gain antennas for the 150 and 450 Mc bands has been introduced by the *Mark Products Division,* Dynascan Corporation, 5439 W. Fargo Avenue, Skokie, Ill.

Known as the Mark "Beacon" line, the antennas range in length from the $75 8-foot model 4506 to the 21-foot model 1506 priced at $150.

Features include encapsulation of all radiating elements in cellular-core plastic, glass-filament construction of housings, and high strength-to-weight ratio for all models.

33-OUNCE HANDIE-TALKIE FOR FM

A fully transistorized portable FM two-way radio for either low or high bands has been introduced by *Motorola, Inc.,* 4501 West Augusta Blvd., Chicago 51, Ill.

The tiny unit — weighing in at 33 ounces — features 1.4 watts RF power output and receiver sensitivity of .5 microvolts (high band) or .35 microvolts (low band).

In addition, the new unit is completely weatherproof and can be used with any one of three separate antennas. Power is provided by a rechargeable nicad battery.

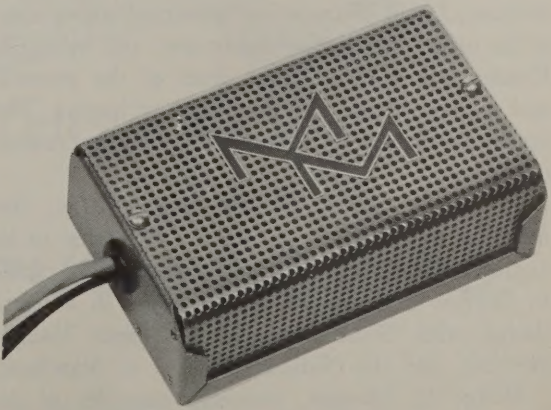
For full details, write Motorola and tell them where you saw this.

NOISE ELIMINATION DEVICE

A new model of the Hallett Message Master, an electronic device for counteracting noise in mobile communications equipment, has been introduced by *Hallett Manufacturing Co.,* 5901 Bowcroft, Los Angeles 16, Calif.

The new model is now completely encased, and is available in two types: one for building into the receiver, the other for outboard mounting. The device acts as a noise blanker, and is adaptable to most FM units.

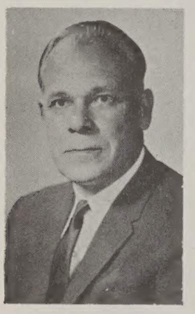
Full descriptive literature is available from the manufacturer.



MILESTONES

PEOPLE, PLACES, AND THINGS IN THE NEWS

This month's file bulges thick with news of *people*: Motorola alone announced four key promotions within the month, and other firms in the industry added a number of additional names to the list.



Heading the *Motorola* file was the announcement that Bernard T. Olson, former regional sales manager for northern California and Nevada, had been named to direct the firm's new Atlanta, Ga., offices. Olson becomes a vice president and also carries the new title of Southeastern Area Manager.

Two account executive managers in the East were also named. George Hilkert, formerly an account executive in Pennsylvania, was named to head up sales in parts of six states plus the District of Columbia. Lester Preston, former New Jersey account executive, was appointed manager of the New England area.

And, concluding the Motorola list, C. Bruce Fritz was named an account executive microwave consultant in Fair Lawn, N. J.

Three *FCC* appointments were announced as a result of the August 1 creating of the Review Board. John J. O'Malley was named acting assistant general counsel in charge of the regulatory division; David Warren was appointed acting chief of the office of opinions and review; and Sylvia D. Kessler was named acting chief of the renewal and transfer division of the broadcast bureau. The appointments filled vacancies left by the creation of the board.

In Dallas, Texas, *Decibel Products, Inc.*, announced the addition of Floyd D. Shipley to its engineering and development staff. Shipley comes to Decibel from responsible positions in antenna design with Texas Instruments, Chance Vought Aircraft, and the National Bureau of Standards.

Hodge C. Morgan, formerly manager of industrial electronic products for Bendix in Baltimore, has been named manager of Communications Products Marketing at *RCA Service Company*, Cherry Hill, N. J. He has major marketing responsibility in the two-way, commercial, and a-v fields for RCAS.

The *places* portion of the file yielded only two items, in contrast to the *people* and *things* divisions:

A new company has been formed in Philadelphia to manufacture and market a line of FM communications gear for non-broadcast applications.

The new firm is *Electrosonic International, Inc.*, a division of Cardinal Engineering Corporation. The parent firm manufactures diamond saw blades.

Heading Electrosonic is Edward Zuzelo. First equipment being planned is a line of receivers and tone-alerted encoders for narrowband FM.

And in Woodstock, N. Y., *Rotron Manufacturing Co., Inc.* announced appointment of Srepco Electronics, Inc. as Rotron distributors for the Ohio regions. Srepco will provide off-the-shelf delivery at factory prices to O.E.M. customers, said Rotron distributor sales manager W. W. Blelock.

Several new systems, totalling nearly 2,000 radio units, round out the *things* file.

Largest order reported was a pair of military contracts received by *General Electric's* Communication Products Department for more than 1,500 radio units. One of the contracts calls for G-E to supply 1,239 transistorized Progress Line units to navy bases throughout the country. The other involves more than 200 TPL units for Redstone arsenal.

A county-wide communications network comprising 30 mobile units controlled from three separate dispatch points is being built by *RCA* for Camden county, N. J. The equipment is being installed and maintained by RCA Service Company, and will be leased by the county.

And finally, *Motorola* announced that they have been selected to develop a command system for the Gemini two-man orbital space vehicle. Spacecraft 54, where are you?

on other horizons

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